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Navy Case No. 84,352

In the United States Patent and Trademark Office

In re: Villalobos et al
Serial No.: 10/601,884 Examiner: Ling X. Xu
Filed: June 24, 2003 Art Unit: 1775
For: Spinel and Process for Making Same Date: June 20, 2005

Appeal Brief

Honorable Commissioner of Patents and Trademarks
Washington, D.C. 20230:

Sir:

This is an appeal from the final rejection of claims 1, 4, 5, 19 and 20.

(1) Real party in interest

The real party in interest in this patent application is the Federal Government, as represented by the Department of Navy.

(2) Related appeals and interferences

This application is not involved in any other appeal or interference.

(3) Status of claims

Claims 1, 4, 5, 19 and 20 stand finally rejected. Claims 2, redundant claim 2, 3 and 21 have been canceled. Claims 6-18 have been withdrawn and claims 19-21 have been newly added, of which, claims 21 has been canceled, as already noted.

(4) Status of amendments

The Amendment After final Rejection, dated April 20, 2005, has been indicated as being no-compliant due to the omission of the withdrawn claims from the claim listing. The Corrected Amendment After Final Rejection, dated May 20, 2005, has been indicated as entered but it did not place the application in condition for allowance.

(5) Summary of the invention

The appealed claims pertain to a sintered and transparent spinel product (l. 21, p. 5 of the specification). In lines 12-15 on p. 12 of the specification, it is disclosed that cost of the product is 1/3 to ½ of the prior art product since the costly HIP procedure can be omitted. The product claims herein are devoid of the sintering aid (p. 12, l. 6), has porosity of less than 0.2% (p. 12, l. 18), is transparent over the wavelength range of about 0.3-5.5 microns (p. 6, l. 16), has transparency in excess of 50% (p. 7, l. 2) and its grains are within about 300% of the average sized grain and is devoid of grains larger than about 1 mm (original claims 2 and 1).

(6) Issues

Whether claims 1, 4, 5, 19 and 20 are anticipated by, under 35 USC 102(b), or obvious over, the Sellers reference, under 35 USC 103(a),

(7) Grouping of Claims

All claims stand or fall together.

(8) Arguments

At the interview held with Examiner Xu, Dr. Sanghera, one of the inventor's herein, discussed the issue of particles and grains in the context of this art, mixing of sintering aids with powders and the true understanding of what is a uniform mixture, the transformation of particles to grains during sintering/densification, the comparison of a prior art spinel product with the new spinel product produced in the manner disclosed in the specification herein, trapped sintering aid in the prior art product and its negative effect on optical properties, presence of grains of exaggerated size in the prior art product and absence thereof in the new product and the negative effect thereof on optical and mechanical properties on the resulting products, and the difference on light transmission due to light reflectance and scattering. Pursuant to the Examiner's suggestion, Dr. Sanghera has prepared a Declaration, which is attached.

It is believed that claims 1, 4, 5, 19 and 20 are unobvious over the Sellers reference. At lines 24-30, in col. 3 of the Sellers reference, it is disclosed that loss of the sintering aid lithium fluoride is to be avoided by heating for not more that about 30 minutes. This is in direct contravention to the claims

herein that claim a spinel product devoid of the sintering aid, which allows the product to have the unobvious and unexpected properties disclosed herein.

Please charge our account #50-0281 for any fee due hereunder.

Sincerely,

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(9) Appendix

Claims on appeal are the following claims 1, 4, 5, 19 and 20:

1. A product that is essentially devoid of a sintering aid and its components, said product comprising spinel that has porosity of less than 0.2 %, said spinel is transparent to light having wavelengths in the range of 0.3-5.5 microns and said spinel having transparency in excess of 50 % for a thickness of 1 mm, its spinel grains are within about 300% of the size of an average grain and is devoid of grains larger than about 1 mm.

4. The product of claim 1 devoid of grains of exaggerated size having transparency of at least 60 % for a 1 mm thickness at a wavelength of 4 microns and said product is a hard crystalline solid selected from the group consisting of oxides of magnesium and aluminum.

5. The product of claim ~~2~~ 1 having transparency of at least 60 % for a 1 mm thickness at a wavelength of 4.0 μm and the spinel is a hard crystalline solid $MgAl_2O_4$.

19. A magnesium aluminate spinel sintered product that is essentially devoid of a sintering aid and its components, that has porosity of less than 0.2%, has uniform grain size wherein the grains are less than 300% of the average grain size and is devoid of grains larger than about 1mm.

20. The product of claim 19 having transparency in excess of 50 % for a thickness of 1 mm to light of 0.3-5.5 μm wavelength.